

DETAILED ACTION

Claim Rejections - 35 USC § 112

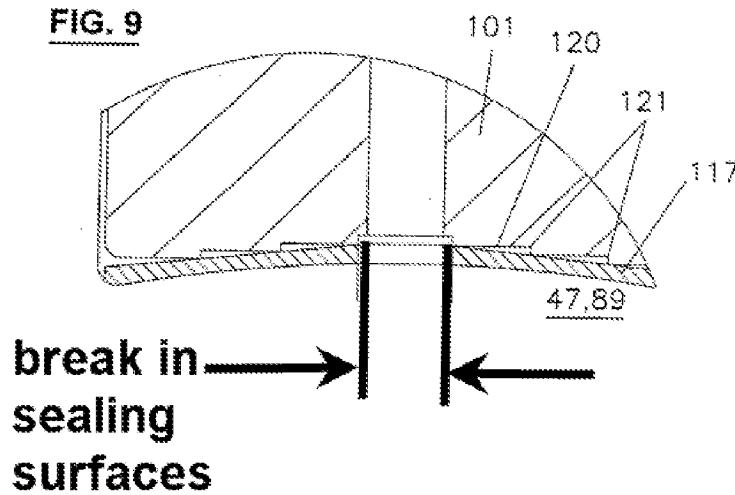
1. The previously made 112 2nd paragraph rejection of Claim 45 is hereby withdrawn in view of amendments to the claims submitted on 25 January 2010. However, a new 112 2nd paragraph rejection is being made because of amendments made to Claims 42 and 50.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 42-47 and 49-50 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. In Re Claims 42 and 50, it is not clear what “along an entire length” means when referring to a sealing surface. When the length of an object is referred to, the object should have at least a portion that is straight, for example: along the length of a conduit. “Convex” generally references something that is bulging. So how can a shape be “convex along an entire length” as claimed ? Further, it does not appear that any of the sealing surfaces have a straight portion whose length can be referred to. Additionally, length is generally a unit of measurement. It does not appear that applicant’s intent for this amendment was to claim an entirely continuous / uniform sealing surface because there is a circular break in the surface that represents the through hole that allows fluid communication with bores (103), see annotations in applicant’s Figure 9 below:



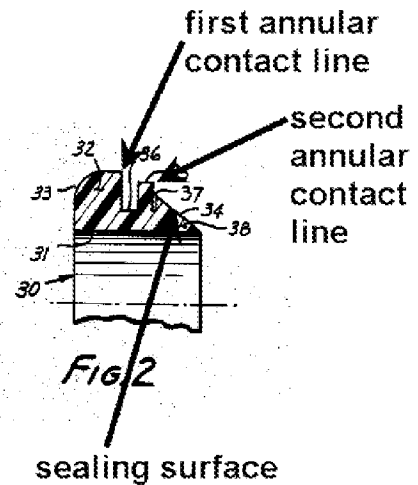
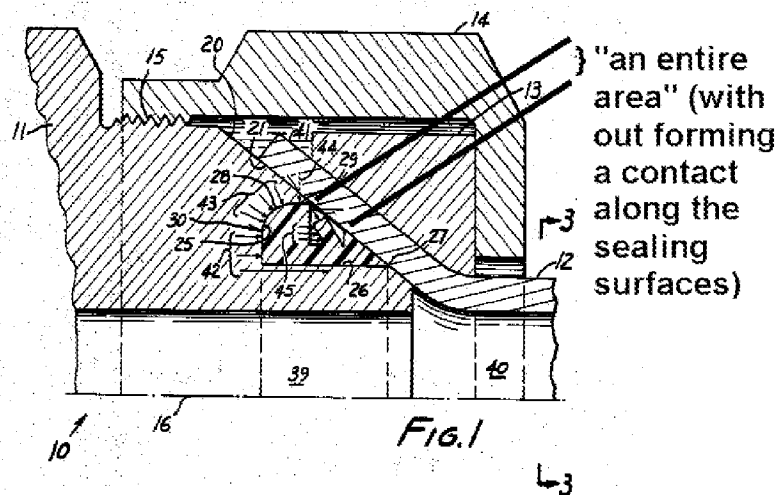
In view of this, the phrase “along an entire length” is indefinite and will not be given patentable weight when analyzing the claims.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. As best understood, Claims 42 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leka et al (US Patent 4,453,898 A) in view of Reddy (US Patent 3,537,731 A)



7. In Re Claims 42 and 50, Leka et al discloses a pump for delivering precisely determined, small liquid flows under high pressure (pump assembly shown in figure 1, and check valve bores shown in Figure 3), the pump comprising:

- at least one pump device including a displacement chamber (piston cylinder 86), at least one working medium access bore formed in the displacement chamber and a piston (piston end 30) that is movable in the displacement chamber;
- a detachable connecting assembly positioned at the working medium access bore (including check valve fitting 72 and conventional end connection 74),

8. However, Leka et al does not disclose the specific connecting structure claimed including a plurality of annular contact lines on at least one of the first and second sealing surfaces.

9. Nevertheless, Reddy discloses seal for a tubing joint comprising detachable connecting assembly (11, 12) the connecting assembly including a first pair of sealing surfaces having a first sealing surface (20, 34) and a second sealing surface (21), the first sealing surface (20) being dome-shaped and convex as depicted (please note that

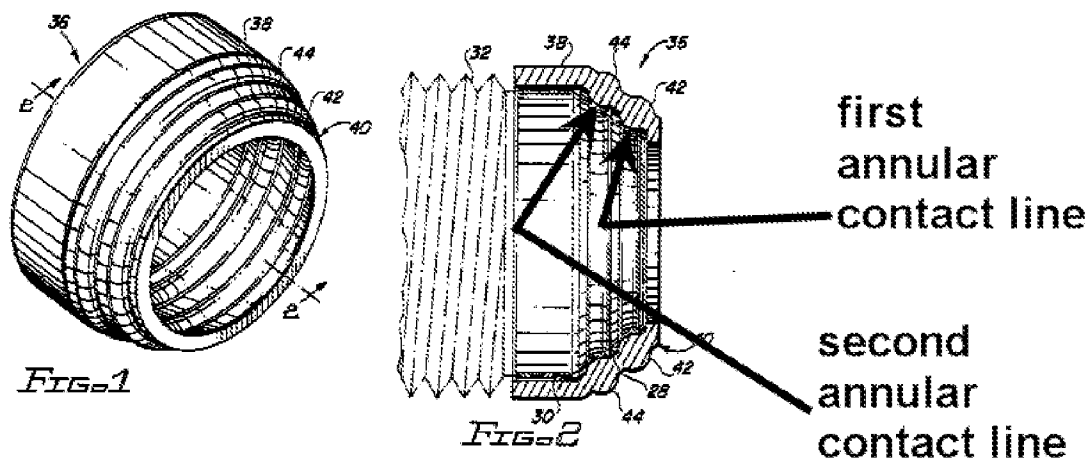
Art Unit: 3746

sealing surface 20 is dome-shaped and convex as much as applicant's first sealing surface because they are the same shape / configuration) and the second sealing surface being concave conical as depicted and non-complementary (in an area of the seal, for details of the seal, see Figure 2) to the first sealing surface,

- at least one of the first and second sealing surfaces having a concentrically stepped surface (35, 32) forming a plurality (at least two as annotated above) of annular contact lines with the other sealing surface without forming a contact along an entire area of either one of the sealing surfaces (see annotations), and the sealing surfaces having respective central openings (31, 40) defining a channel connected to the working medium access bore (39)

10. It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the end of the threaded portion of the end connection (74) of Leka et al so it has a dome shaped convex shape with a seal that contacts the concave conical surface at the inlet passage (88) of Leka et al as taught by Reddy for the purpose of creating a reliable seal (Column 1, Line 47 of Reddy).

11. Alternatively, as best understood, Claims 42-45 & 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leka et al (US Patent 4,453,898 A) in view of Swauger (US Patent 5,503,438 A)



12. In Re Claims 42 and 50, Leka et al discloses a pump for delivering precisely determined, small liquid flows under high pressure (pump assembly shown in figure 1, and check valve bores shown in Figure 3), the pump comprising:

- at least one pump device including a displacement chamber (piston cylinder 86), at least one working medium access bore formed in the displacement chamber and a piston (piston end 30) that is movable in the displacement chamber;
- a detachable connecting assembly positioned at the working medium access bore (including check valve fitting 72 and conventional end connection 74),

13. However, Leka et al does not disclose the specific connecting structure claimed including a plurality of annular contact lines on at least one of the first and second sealing surfaces.

14. Nevertheless, Swauger discloses a tube coupling having a first pair of sealing surfaces having a first sealing surface (28) and a second sealing surface (inside of skirt 40), the first sealing surface being dome-shaped and convex (please note that sealing surface 20 is dome-shaped and convex as much as applicant's first sealing surface

Art Unit: 3746

because they are the same shape / configuration) as depicted and the second sealing surface being concave conical as depicted and non-complementary (Figure 4) to the first sealing surface,

- at least one of the first and second sealing surfaces having a concentrically stepped surface (42, 44) forming a plurality (at least two as annotated above) of annular contact lines (Since surface 28 is tangential to the integrally formed O-Rings 42 and 44) with the other sealing surface without forming a contact along an entire area of either one of the sealing surfaces, and the sealing surfaces having respective central openings (as depicted) defining a channel connected to the working medium access bore (26).

15. It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the end of the threaded portion of the end connection (74) of Leka et al so it has a dome shaped convex shape that contacts the concave conical surface at the inlet passage (88) of Leka et al through an intermediate sealing boot (36) as taught by Swauger for the purpose of providing a reliable leak proof fitting (Column 3, Lines 33-35 of Swauger).

16. In Re claim 43, Swauger discloses embedded O-Ring seals (42, 44), at least part of which are interposed between the first and second sealing surfaces.

17. In Re Claim 44, Swauger discloses a second pair of sealing surfaces, one of which is the exterior of skirt (40 which is part of sealing boot 36) and the other being the

Art Unit: 3746

interior surface of flared end (14). The sealing boot (36) reads on a sealing body disposed between the first and second pairs of sealing surfaces. The interior and exterior of skirt (40) read on inner sealing surfaces being formed on the sealing body (36). Column 3, Line 17 states that the sealing boot is made of Teflon, which is a synthetic material which is capable of resisting high pressure to an extent, and does not change dimensions since it is a solid.

18. In Re Claim 45, Swauger discloses a third pair of sealing surfaces between the exterior threads of end connection (32) and the interior threads of the nut (24). The surface of the exterior threads being the exterior sealing surface, and the surface of the interior threads being inner sealing surface. The connecting body (30) is disposed between the first and third pairs of sealing surfaces. When fully assembled, the connection forms a tight junction with the connecting body.

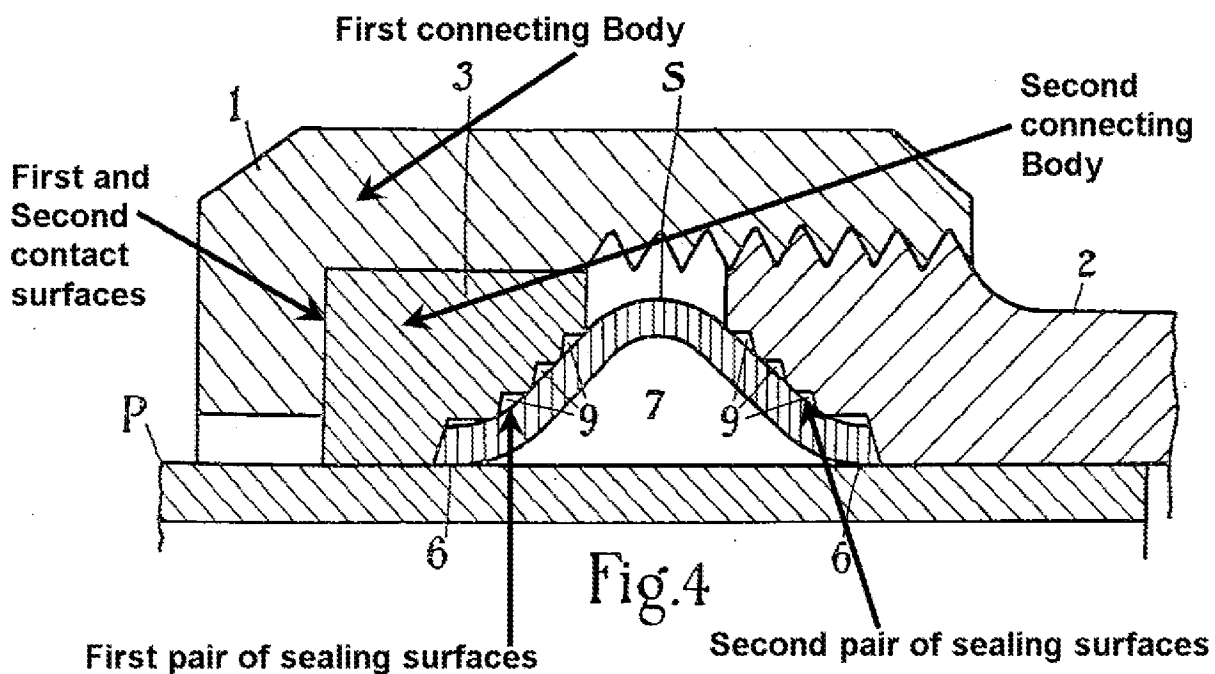
19. Alternatively, as best understood, Claims 42, 46-47 & 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leka et al (US Patent 4,453,898 A) in view of Lamont (US Patent 1,957,605 A)

20. In Re Claims 42 and 50, Leka et al discloses a pump for delivering precisely determined, small liquid flows under high pressure (pump assembly shown in figure 1, and check valve bores shown in Figure 3), the pump comprising:

Art Unit: 3746

- at least one pump device including a displacement chamber (piston cylinder 86), at least one working medium access bore formed in the displacement chamber and a piston (piston end 30) that is movable in the displacement chamber;
- a detachable connecting assembly positioned at the working medium access bore (including check valve fitting 72 and conventional end connection 74),

21. However, Leka et al does not disclose the specific connecting structure claimed including a plurality of annular contact lines on at least one of the first and second sealing surfaces.



22. Nevertheless, with reference to Figure 4 annotated above, Lamont discloses a detachable connecting assembly including a pair of sealing surfaces (Page 1, Column 2, Lines 90-92: "Couplings according to the present invention can be applied to pipes of

Art Unit: 3746

all sizes in which fluid-tight joints are essential”, Page 3, Column 1, Line 66: “fluid-tight seal”, Page 2, Column 2, Line 80-82: “plurality of sealed air chambers”) as annotated,

- the first sealing surface on element (S) being dome shaped and convex as depicted
- the second sealing surface on element (2) being concave conical and non complimentary (spaced from the sleeve) to the first sealing surface as depicted
- the second sealing surface having a concentrically stepped surface (Page 2, Column 2, Lines 78-80: “internal surfaces have been stepped”) forming a plurality of (4) annular contact lines with the other first sealing surface without forming a contact along the entire area, the sleeve S and element (2) have a central opening that defines a channel which has pipe (P) that carries the working medium

23. It would have been obvious to a person having ordinary skill in the art at the time of the invention to substitute the head of fitting (72) and end connection (74) of Leka et al with the connecting assembly in Figure 4 of Lamont because Column 1, Page 1, Lines 1-2 of Lamont suggests that the coupling relates to Tubes and the fitting of Leka et al is a conventional end connection of a pump inlet tube (Column 6, Lines 22-23 of Leka et al). The advantage of Lamont is that a number of different sealing contacts are formed “which thereby form a perfectly leakproof joint” (Page 1, Column 2, Lines 63-69 of Lamont).

24. In Re Claim 46, the annotated figure of Lamont shown above discloses a first connecting body having a first (contact) surface which contacts a second (contact)

Art Unit: 3746

surface on the second connecting body. The second connecting body has one of the first pair of sealing surfaces, and disposed between the second contact surface and the sealing surface. At least part of Pipe (P) reads on a duct for the working medium and is clearly fixed to the second connecting body and communicates with the central opening/channel in the sealing surface of the second connecting body.

25. In Re Claim 47, Leka et al. teach the pump according to claim 46, wherein the contact surfaces are cambered (each contact surface is rounded) and complementary to each other for example, the recess that holds seal (52 in Figure 3) is rounded and complimentary to the surface of the seal (the contact surfaces are complementary in the sense that one fits inside of the other). Such a modification to the cornered contact surfaces of Lamont would be obvious to avoid damage from sharp edges.

26. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leka et al (US Patent 4,453,898 A) in view of Lamont (US Patent 1,957,605 A) and further in view of Yotam et al (U.S. Patent 4,595,495 A)

27. Leka et al. teach a first pump device each according to the pump of claim 46 (see the rejection of claim 46 above) comprised of a displacement chamber, but do not teach a second pump device downstream of the first pump device that is operable as a storage device of pulsation of the first pump device.

Art Unit: 3746

28. Yotam et al. teach a pump device with multiple cylinder bodies (59, 69, and 75) and multiple pistons (58, 68, and 74) arranged in series (see figure 7) in such a way that the outlet of one pump is connected to the inlet of another pump.

29. It would have been obvious to one of ordinary skill in the art at the time of invention to connect several of the pumps disclosed by Leka et al. in series as taught by Yotam et al. in order to discharge fluid at a higher pressure or to ensure that the fluid is discharged at a constant pressure. When multiple piston pumps are arranged in series as taught by Yotam et al., the pump stages downstream of the first pump stage would act to store pulsation from the first pump stage.

Response to Arguments

30. Applicant's arguments with respect to all the claims have been considered but are not persuasive in view of the indefiniteness rejection (112 2nd paragraph) above.

Conclusion

31. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bonnet (US Patent 3,133,738 A) discloses another sealing cartridge in Figure 5 as annotated below:

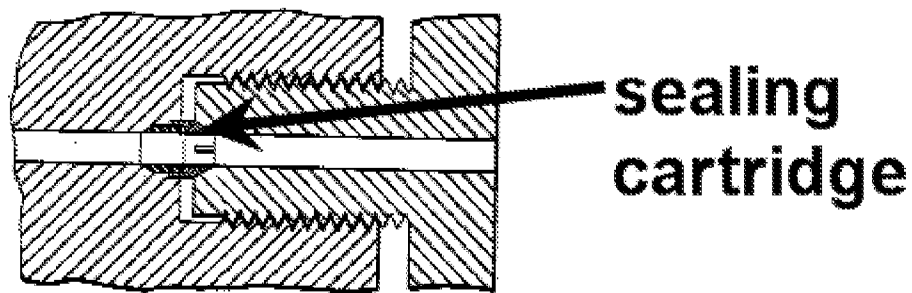


FIG. 5

32. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DNYANESH KASTURE whose telephone number is (571)270-3928. The examiner can normally be reached on Mon-Fri, 9:00 AM to 4:00 PM.

Art Unit: 3746

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272 - 7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art
Unit 3746

DGK